

Spintronics is a dynamically developing branch of electronics which for transfer, processing and storing of information use not only electron charge but also its spin. Materials appropriate for a construction of spintronic devices should sustain the spin order for a sufficiently long time enabling a manipulation of spins. Simultaneously, in these materials the spin of electrons should be possible to transport fast and long enough across the device. In this work, heterostructure of GaAs/AlGaAs fulfilling these requirements is investigated by a pump-probe technique. In particular, long spin lifetimes of electrons in the heterostructure are studied using the resonant spin amplification method and with a use of the pulse picker. The nuclear spin polarization and the effect of an applied electric current on the studied heterostructure are also investigated in this work. Spectral filters are used to improve the existing experimental setup for the pump-probe technique and to measure a magneto-optical spectrum of the investigated heterostructure.